Haptoglobin

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Haptoglobin is a plasma glycoprotein formed in the liver that binds very tightly to the extracorpuscular hemoglobin molecule.

About 10% of the degraded Hb is released into the circulation each day, creating extracorpuscular Hb. The remaining 90 % is present in old erythrocytes, which are degraded in RES cells. The amount of Hp in human plasma ranges from 400 to 1800 mg of Hb-binding capacity per liter. The haptoglobin-hemoglobin complex is quickly absorbed from the bloodstream by cells of the reticuloendothelial system.

> Free Hb passes through the renal glomeruli into the tubules and tends to precipitate there. However, the Hb-Hp complex is large enough that it does not pass through the glomeruli. The function of Hp therefore consists in preventing the loss of free Hb by the kidney. This preserves the valuable iron present in Hb, which would otherwise leave the body.

Structure

Haptoglobin is an α2β2 tetramer, i.e. it is composed of two alpha chains and two beta chains. There are three types of alpha chains, therefore different types of haptoglobin with different molecular sizes can be distinguished (Hp 1-1, Hp 2-1, Hp 2-2 − these 3 phenotypes are controlled by 2 genes, designated as Hp1 and Hp2. Hp 2-1 phenotype is heterozygous), however, this distinction has no clinical significance.[1]

Diagnostic use

Low levels of Hp have been found in patients with hemolytic anemias. This is explained by the fact that while the half-life of Hp is about 5 days, the half-life of the Hb-Hp complex is about 90 minutes, so that the complex is much faster removed by hepatocytes. Thus, when Hp is bound to Hb, it disappears from the plasma about 80 times faster than Hp alone. Therefore, the level of Hp drops sharply in hemolytic anemias. The serum concentration of haptoglobin increases in **acute condition**s (acute phase protein) and decreases in **proteosynthesis disorders in the liver**.

Links

Related articles

- Vyšetření hemoglobinu a jeho metabolismu (czech wikiskripta)
- Plasma proteins
- Hemoglobin

References

1. RACEK, J. *Klinická biochemie.* First edition. Galén – Karolinum, 1999. pp. 63. ISBN 80-7262-023-1.

Used literature

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